

A NEW SEVERN FORMATION (EARLY MIDDLE MAASTRICHTIAN, LATE CRETACEOUS) LOCALITY IN PRINCE GEORGES COUNTY, MARYLAND

By

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Abstract

Construction activities in Prince Georges County, Maryland, near Washington, D.C., exposed a richly fossiliferous section of the Late Cretaceous Severn Formation. Some of the more prominent constituents of the fossil fauna are discussed.

Geology

The Severn Formation, named for its exposures on the east bank of the Severn River in Maryland, outcrops along a relatively narrow band that crosses eastern Maryland in a northeast/southwest direction. The formation is marine and is fossiliferous, especially in outcrops where groundwater leaching of carbonate has been limited. It is thickest in the east, thinning down to under 20 ft in western Prince Georges County near Washington, D.C. The typical lithology is a dark-gray, fine micaceous clayey sand of variable glauconite content (Sherman & Ziegler, 1978). The formation is early middle Maastrichtian (Late Cretaceous) in age, corresponding to the Navarroan Provincial stage (Brouwers & Hazel, 1978). Darton (1891) originally proposed the name to apply to all sediments between the underlying Magothy Formation (Turonian) and the overlying Pamunkey Group (early Tertiary). The term Monmouth Formation, proposed by Clark et al. (1897) for sediments in New Jersey, was also used for the Maastrichtian-age marine strata of Maryland until Minard et al. (1978) reintroduced the term Severn Formation for the Monmouth Formation in Maryland.

In 1981, construction of an industrial park at the southeast quadrant of the junction of Interstate 95 and Landover Road, Prince Georges County, exposed highly fossiliferous sediments of the Severn Formation. The site produced a rich fauna of invertebrates and vertebrates. While construction continues at this site, recent excavations have not exposed substantial portions of the Severn Formation. Most of the

molluscs were obtained from medium to large concretions weighing from 10 lb to more than 80 lb. The concretions were concentrated in a layer 2 to 6 ft below the top of the formation. Excavations for building foundations exposed up to 15 feet of the formation, unearthing large numbers of these concretions. A number of well-preserved molluscs were also obtained from the clayey sand matrix. The more common constituents of the fauna at this site are listed in Table 1.

The Severn Formation was deposited in the Salisbury Embayment (Brouwers & Hazel, 1978), a near-shore basin covering southern Delaware, eastern Maryland, and northeastern Virginia. The relative abundance of lignite and the presence of a significant scrap fauna of land vertebrates at this site is consistent with such a near-shore environment.

Molluscs

In contrast to typical Cretaceous fossils from New Jersey or Delaware, the molluscs of the Severn Formation are frequently well preserved. At this site original shell and permineralized shell were common forms of preservation. Cephalopods, which were well represented in the molluscan fauna, included large specimens of the ammonite *Sphenodiscus lenticularis* (Owen) and the nautiloid *Eutrephoceras dekayi* Morton. Some concretions contained hundreds of small specimens of *Baculites* sp. Cephalopods at this site were frequently preserved with portions of original shell intact. In this case all layers were preserved, not just the mother-of-pearl layer as is typical of ammonites from the U.S. western interior. Prominent in the pelecypod fauna were *Exogyra costata* Say, *Cypræmaria alta* Conrad, two species of *Cymbophora*, *Granocardium eufalense* (Conrad), *Crassatella vadosa* Morton, *Veniella conradi* (Morton), and *Nucula slackiana* Gabb. Well-preserved specimens of the gastropods *Gyrodes* (3 species), *Liopeplum* (3 species), *Euspira rectilabrum* (Conrad) were frequently encountered. Occasionally, a large, complete specimen of *Turitella bilira* Stephenson or *Pyropsis cornutus* Sohl could be extracted from a concretion without excessive damage. Nearly 60 of the more than 100 species of molluscs described from the Severn Formation were relatively common at this site.

Other Invertebrates

With the exception of the solitary coral *Micrabacia marylandica* Gardner, the ghost shrimp *Protocalianassa mortoni* (Pilsbry), and two species of worms, other invertebrates did not represent a significant portion of the megafauna. Brouwers & Hazel (1978) described 37 species of ostracods from nearby exposures of the Severn Formation.

Vertebrates

Vertebrate remains were not confined to the nodule zone and were found as the exposed formation in construction piles was allowed to erode. The neoselachian fauna (sharks, rays, and sawfishes) included at least 10 species. Large rostral teeth of the ganopristine sawfish *Ischyrrhiza mira mira* Leidy were usually found in somewhat damaged condition. Mackerel sharks were represented by teeth of *Cretolamna* cf. *serrata* (Agassiz) and *C. appendiculata pachyrhiza* Herman. The extinct cownose sharks typical of most Late Cretaceous deposits were well represented here by the teeth of *Squalicorax kaupi* (Agassiz) and *S. pristodontus* (Agassiz). The sand sharks *Hypotodus* sp. and *Odontaspis* sp. were also quite common. Rarely found were teeth of angel sharks (*Squatina hassei* Leriche),

isolated pavement teeth of eagle rays (*Myliobatis* sp.), and multicusped teeth of nurse sharks (*Nebrius* sp.).

The remaining ichthyofauna included a splenial jaw section of the pycnodontid *Anomoeodus phaseolus* (Hay), teeth of *Enchodus ferox* Leidy, and a number of otoliths (teleost ear stones). Huddleston & Savoie (1983) analyzed Severn otoliths from a nearby site and determined that more than half the specimens belonged to *Vorhisia* sp.

Marine and terrestrial reptiles, represented by a large scrap fauna, are the subject of a paper by Baird (1986). A large tooth representing the first record of a plesiosaur in Maryland was collected by the second author from a construction pile in April, 1982. Baird (personal communication) has identified this specimen as probably belonging to *Cimoliasaurus magnus* Leidy.

Table 1. Faunal List

Pelecypoda

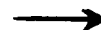
Exogyra costata Say
Agerostrea mesenterica (Morton)
Pycnodonte (Gryphaea) conveza
 (Say)
Anomia ornata Gabb
A. argentaria Morton
Panope decisa Conrad
Granocardium eufalense (Conrad)
Crassatella vadosa Morton
C. pteropsis (Conrad)
Nucula slakiana Gabb
Nuculana rostratruncata
 (Gardner)
Cymbophora appressa (Gabb)
C. berryi (Gardner)
Legumen planulatum (Conrad)

Leptosolen biplicata Conrad
Veniella conradi (Morton)
Liopistha protesta (Conrad)
Tenea pinguis Conrad
Cyprimaria alta Conrad
C. depressa (Conrad)
Trigonia eufaulensis (Gabb)
Lithophaga carolinensis (Conrad)
Gonioclasma sp.
Cucullaea deatsvillensis
 (Stephenson)
Xylophagella irregularis (Gabb)
Clavipholas pectrosa (Conrad)
Cuneolus pectrosa (Conrad)
C. tippana (Conrad)
Glycimeris mortoni (Conrad)

Gastropoda

Liopeplum coronatum Sohl
L. cretaceum (Conrad)
L. canalis (Conrad)
Fusimilis kummeli Sohl
?Drilluta sp.
Lupira sp.
Deussenia ripleyana Harbison
Stantonella ripleyana Conrad
Euspira rectilabrum (Conrad)
Ringicula pulchella Shumard
Palademetes cancellaria (Conrad)
Urceolabrum tuberculatum Wade
Acirsa flexicostata Sohl

Weeksia peplanata (Johnson)
Beretra speciosa Sohl
Remera flexicostata Sohl
Gyrodes apillmani Gabb
G. subcarinatus Stephenson
G. supraplicatus (Conrad)
Arroges (Latiala) lobata Wade
Pyropsis cornutus Sohl
Xenophora leprosa (Morton)
Turritella bilira Stephenson
T. tippana Conrad
Ellipsoscapa mortoni (Forbes)
Napulus sp.



Cephalopoda

Baculites sp.
Sphenodiscus lenticularis (Owen)
Eutrephoceras dekeyi (Morton)

Discoscaphites abyssinius? (Morton)
D. conradi gulosus (Morton)
D. conradi conradi (Morton)

Crustacea

Protocallianassa mortoni (Pilsbry)

Annelida

Longitubus lineatus (Weller)

Hamulus falcatus (Conrad)

Anthozoa

Micrabacia marylandica Gardner

Chondrichthyes

Ischyrrhiza mira mira Leidy
Cretolamna cf. *serrata* (Agassiz)
C. appendiculata pachyrrhiza
 Herman
Squalicorax kaupi (Agassiz)
S. pristodontus (Agassiz)

Squatina hassei Leriche
Hypotodus sp.
Odontaspis sp.
Nebrius sp.
Myliobatis sp.

Osteichthyes

Anomocodus phaseolus (Hay)
Enchodus ferox Leidy

Stephanodus sp.

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PLATE I

- 1 *Micrabacia marylandica* Gardner (10 mm diameter)
- 2 *Squalicorax kaupi* (Agassiz), lingual view (9.5 mm high)
- 3 *Hypotodus* sp., lingual view (11 mm high)
- 4 *Cretolamna* cf. *serrata* (Agassiz), labial view (16 mm high)
- 5 *Ondontaspis* sp., lingual view (20 mm high)
- 6 *Anomoeodus phaseolus* (Hay), occlusal view of splenial jaw section (41 mm diagonal length)
- 7 *Squalicorax pristodontus* (Agassiz), labial view (31 mm slant height)
- 8 *Ischyrhiza mira mira* Leidy, root and partial rostral spine (40 mm high)
- 9 *Cretolamna appendiculata pachyrhiza* Herman, labial view (21 mm high)
- 10 *Cymbophora apressa* Gabb (25 mm long)
- 11 *Crassatella vodosa* Morton (43 mm high)
- 12 *Crassatella vadosa* Morton, side view of specimen in Fig. 11
- 13 *Crassatella pteropsis* (Conrad) (30 mm long)

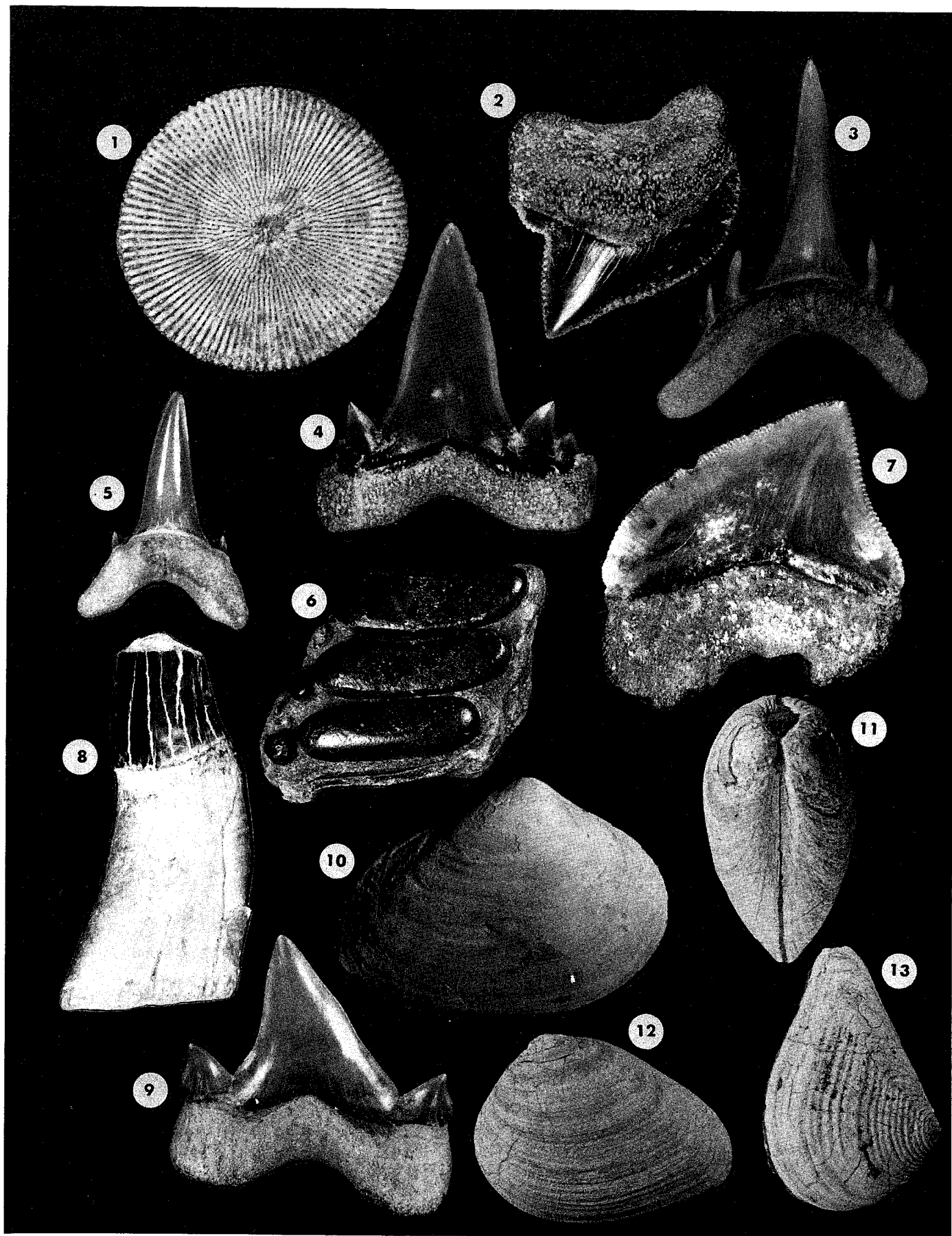


PLATE II

- 14 *Sphenodiscus lenticularis* (Owen) (175 mm diameter)
- 15 *Baculites* sp. (53 mm long)
- 16 *Discoscaphites conradi conradi* (Morton), juvenile specimen (53 mm diameter)
- 17 *Nucula slackiana* (Gabb) (30 mm long)
- 18 *Discoscaphites conradi conradi* (Morton), adult specimen (68 mm long)
- 19 *Eutrephoceras dekayi* (Morton), two views of same specimen (70 mm maximum width of aperture)
- 20 *Ellipsoscapa mortoni* (Forbes) (22 mm long)
- 21 *Turritella bilira* Stephenson (90 mm long)
- 22 *Euspira rectilabrum* (Conrad) (15 mm wide)
- 23 *Liopeplum canalis* (Conrad) (42 mm long)
- 24 *Gyrodes spillmani* Gabb (19 mm wide)
- 25 *Napulus* sp. (18 mm wide)
- 26 *Gyrodes subcarinatus* (Conrad) (17 mm wide)
- 27 *Clavipholas pectrosa* (Conrad) (29 mm long)

